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## NOTICE OF ALLOWANCE AND FEE(S) DUE

23122 7590 02/24/2004

RATNERPRESTIA  
P O BOX 980  
VALLEY FORGE, PA 19482-0980

EXAMINER

CRANE, SARA W

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 02/24/2004

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/830,036	04/19/2001	Nobuyuki Komaba	NSG-188US	9422

TITLE OF INVENTION: LIGHT-EMITTING THYRISTOR AND SELF-SCANNING LIGHT-EMITTING DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1330	\$0	\$1330	05/24/2004

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

## HOW TO REPLY TO THIS NOTICE:

## I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status is changed, pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above and notify the United States Patent and Trademark Office of the change in status, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check the box below and enclose the PUBLICATION FEE and 1/2 the ISSUE FEE shown above.

☐ Applicant claims SMALL ENTITY status.  
See 37 CFR 1.27.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER:** Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

# **PART B - FEE(S) TRANSMITTAL**

Complete and send this form, together with applicable fee(s), to: **Mail**

**Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
or Fax (703) 746-4000**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

23122 7590 02/24/2004

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Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

## **Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/830,036	04/19/2001	Nobuyuki Komaba	NSG-188US	9422

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nonprovisional	NO	\$1330	\$0	\$1330	05/24/2004

EXAMINER	ART UNIT	CLASS-SUBCLASS
CRANE, SARA W	2811	257-096000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

## **3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)**

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the USPTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent); ☐ individual ☐ corporation or other private group entity ☐ government

## **4a. The following fee(s) are enclosed:**

- ☐ Issue Fee
- ☐ Publication Fee
- ☐ Advance Order - # of Copies \_\_\_\_\_

## **4b. Payment of Fee(s):**

- ☐ A check in the amount of the fee(s) is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

Director for Patents is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

(Authorized Signature)

(Date)

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Alexandria, Virginia 22313-1450.

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TRANSMIT THIS FORM WITH FEE(S)



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09/830,036	04/19/2001	Nobuyuki Komaba	NSG-188US	9422
23122	7590	02/24/2004	EXAMINER	
RATNERPRESTIA P O BOX 980 VALLEY FORGE, PA 19482-0980			CRANE, SARA W	
			ART UNIT	PAPER NUMBER
			2811	
DATE MAILED: 02/24/2004				

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 127 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 127 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) system (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (703) 305-1383. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

er

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/830,036	KOMABA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Sara W. Crane	2811	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment of 8 January 2-4, now entered.
2. ☒ The allowed claim(s) is/are 1-5, 12-17.
3. ☒ The drawings filed on 19 April 2001 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |   |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)           |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment                              |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance             |
|   | 9. <input type="checkbox"/> Other _____   |

  
Sara W. Crane  
Primary Examiner  
Art Unit: 2811

NSG-188US

Appln. No.: 09/830,036  
Amendment Dated January 8, 2004  
Reply to Office Action of October 21, 2003

**Amendments to the Claims:** This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) A light-emitting thyristor, comprising:

a GaAs substrate; and

a GaAs buffer layer provided on the GaAs substrate; and

four layers consisting of a first conductivity type of AlGaAs layer and a second conductivity type of AlGaAs layer stacked alternately on the buffer layer wherein the four layers form the light-emitting thyristor;

wherein the AlGaAs layer just above the buffer layer is composed of a plurality of AlGaAs layers, Al compositions thereof being increased upward in steps.

2. (Original) The light-emitting thyristor of claim 1, wherein a quantum well layer or a strained superlattice structure is inserted into the uppermost layer of the plurality of AlGaAs layers.

3. (Currently Amended) A light-emitting thyristor, comprising:

a GaAs substrate; and

a GaAs buffer layer provided on the GaAs substrate; and

four layers consisting of a first conductivity type of AlGaAs layer and a second conductivity type of AlGaAs layer stacked alternately on the buffer layer wherein the four layers form the light-emitting thyristor;

wherein the Al composition of the AlGaAs layer just above the buffer layer is increased upward continuously.

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Amendment Dated January 8, 2004  
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4. (Original) The light-emitting thyristor of claim 3, wherein a quantum well layer or a strained superlattice structure is inserted into the AlGaAs layer just above the buffer layer.

5. (Original) A light-emitting thyristor, comprising:

a GaAs substrate;

a GaAs buffer layer provided on the GaAs substrate; and

four layers consisting of a first conductivity type of AlGaAs layer and a second conductivity type of AlGaAs layer stacked alternately on the buffer layer;

wherein a quantum well layer on a strained superlattice structure is inserted between the buffer layer and the AlGaAs layer just above the buffer layer, or into the AlGaAs layer just above the buffer layer.

6 -11 Canceled.

6 17. (Previously Presented) A self-scanning light-emitting device, comprising:

a structure in which a plurality of light-emitting elements each having a control electrode for controlling threshold voltage or current for light-emitting operation are arranged, the control electrodes of the light-emitting elements are connected to the control electrodes of the light-emitting elements are connected to the control electrode of at least one light-emitting element located in the vicinity thereof via an interactive resistor, and a plurality of wirings to which voltage or current is applied are connected to electrodes for controlling the light emission of the light-emitting elements,

wherein the light-emitting element is a light-emitting thyristor as set forth in any one of claims 1-5.

7 13. (Previously Presented) A self-scanning light-emitting device, comprising:

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Amendment Dated January 8, 2004  
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a structure in which a plurality of light-emitting elements each having a control electrode for controlling threshold voltage or current for light-emitting operation are arranged, the control electrodes for the light-emitting elements are connected to the control electrode of at least one light-emitting element located in the vicinity thereof via an electrically unidirectional element, and a plurality of wiring to which voltage or current is applied are connected to electrodes for controlling the light-emission of light-emitting elements,

wherein the light-emitting element is a light-emitting thyristor as set forth in any one of claims 1-5.

8 14. (Original) The self-scanning light-emitting device of claim 13, wherein the electrically unidirectional element is a diode.

9 15. (Previously Presented) A self-scanning light-emitting device, comprising:

a self-scanning transfer element array having such a structure that a plurality of transfer elements each having a control electrode for controlling threshold voltage or current for transfer operation are arranged, the control electrodes of the transfer elements are connected to the control electrode of at least one transfer element located in the vicinity thereof via an interactive resistor, power-supply lines are connected to the transfer elements by electrical means, and clock lines are connected to the transfer elements, and

a light-emitting element array having such a structure that a plurality of light-emitting elements each having a control electrode for controlling threshold voltage or current are arranged, the control electrodes of the light-emitting element array are connected to the control electrodes of said transfer elements by electrical means, and lines for applying current for light emission of the light-emitting element are provided,

wherein the light-emitting element is a light-emitting thyristor as set forth in any one of claims 1-5.

10 16. (Previously Presented) A self-scanning light-emitting device, comprising:

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Amendment Dated January 8, 2004  
Reply to Office Action of October 21, 2003

a self-scanning transfer element array having such a structure that a plurality of transfer elements each having a control electrode for controlling threshold voltage or current for transfer operation are arranged, the control electrodes of the transfer elements are connected to the control electrode of at least one transfer element located in the vicinity thereof via an electrically unidirectional element, power-supply lines are connected to the transfer elements by electrical means, and clock lines are connected to the transfer elements, and

a light-emitting element array having such a structure that a plurality of light-emitting elements each having a control electrode for controlling threshold voltage or current are arranged, the control electrodes of the light-emitting element array are connected to the control electrodes of said transfer elements by electrical means, and line for applying current for light emission of the light-emitting element are provided,

wherein the light-emitting element is a light-emitting thyristor as set forth in any one of claims 1-5.

17. (Original) The self-scanning light-emitting device of claim 16, wherein the electrically unidirectional element is a diode.